

SUPPORT FOR THE AMENDMENTS

This Amendment cancels Claim 15; amends Claim 1; and adds new Claims 20-21. Support for the amendments is found in the specification and claims as originally filed. In particular, support for Claim 1 and new Claims 20-21 is found in canceled Claim 15 and in the specification at least at page 14, lines 15-18. No new matter would be introduced by entry of these amendments.

Upon entry of these amendments, Claims 1-3 and 5-14, 17 and 19-21 will be pending in this application. Claims 1 and 8 are independent.

REMARKS

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

Applicants thank the Examiner for the indication that Claim 8 is allowed. Office Action at page 2, line 4.

Applicants thank the Examiner for the courtesies extended to their representative during the February 25, 2003, personal interview. As discussed at the interview, the present invention provides a light, compact and thin battery having a positive and a negative electrode firmly joined together by an adhesive resin layer, which secures both electron insulation and ion conduction between the electrodes and decreases resistance between electrodes, i.e., internal resistance of the battery, to improve battery characteristics.

Claims 1-3, 5-7, 9-15, 17 and 19 are rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,287,720 ("Yamashita") as evidenced by U.S. Patent No. 6,096,456 ("Takeuchi"). Yamashita discloses a conventional battery using a casing (abstract, line 6; column 3, line 29), instead of the inventive adhesive layer, to hold together the positive and negative

electrodes. Although Yamashita at column 7, line 66 to column 8, line 2, discloses a binder in which a *volume ratio* of binder to insulating particles can be from 1/500 to 5/3, Yamashita's examples disclose only a particle to binder *weight ratio* of 100/5 (=20)(see, e.g., Yamashita at column 26, lines 34-35 ("zeolite/PVDF weight ratio: 100/5"); column 28, lines 15-16, ("aramide/PVDF (sic) weight ratio: 100/5"); column 29, lines 63-64 ("α-Al₂O₃/PVDF weight ratio: 100/5"); column 33, lines 6-7 ("α-Al₂O₃/PVDF (sic) weight ratio: 100/5")). Yamashita at column 7, lines 64-65, discloses that the binder can be poly(vinylidene fluoride).

However, Yamashita is silent about adhesive layer peel strength. Because Yamashita's battery uses a casing to hold electrodes together, Yamashita is not concerned with adhesive layer peel strength.

Takeuchi is cited for disclosing "electrodes have holes, or are uneven". Office Action at page 4, lines 8-9.

The following FIG. A, from the Amendment After Final Rejection filed December 12, 2002, compares inventive examples with Yamashita's examples.

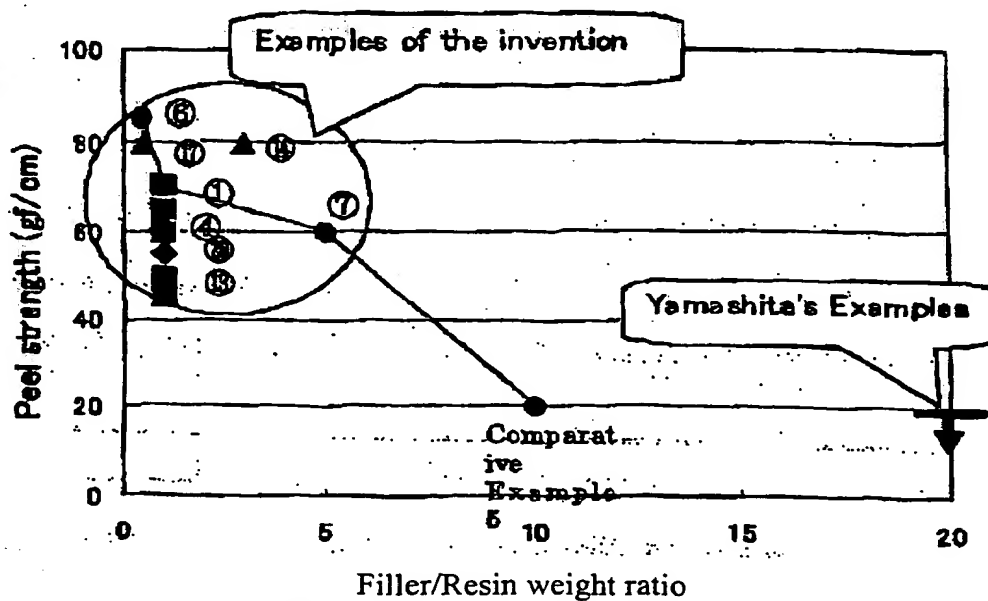


FIG. A: Comparison of peel strength

Any *prima facie* case of obviousness based on the cited prior art is rebutted by the significant improvement shown in FIG. A in adhesive layer peel strength "in a range of from 50 gf/cm to 85 gf/cm" that is achieved in accordance with the invention of independent Claim 1 when "a weight ratio of the adhesive resin to the filler is not less than 1/5 and not more than 2" and "the adhesive resin comprises a polymer selected from the group consisting of polyvinylidene fluoride and polyvinyl alcohol". Thus, the cited prior art fails to have rendered obvious the claimed invention.

Applicants thank the Examiner for the indication at the February 25, 2003, personal interview that the above amendments to independent Claim 1 overcome Yamashita. Interview Summary dated February 25, 2003.

During the February 25, 2003, personal interview the Examiner asserted that independent Claim 1 is anticipated by U.S. Patent No. 5,948,464 ("Delnick").

Delnick discloses an electrochemical cell comprising a cathode electrode and an anode electrode separated by a porous composite separator layer comprising a solid particulate material and a polymer binder. Delnick discloses that typical binders include polyvinylidene fluoride-hexafluoropropylene copolymer, which Delnick defines to be "PVDF". See, Delnick at column 4, line 38; column 7, lines 12-15; column 10, lines 2-4; column 11, lines 31-32.

However, Delnick's "PVDF" (i.e., polyvinylidene fluoride-hexafluoropropylene copolymer) is not the polymer polyvinylidene fluoride. Delnick fails to suggest the independent Claim 1 limitation that "the adhesive resin comprises a polymer selected from the group consisting of polyvinylidene fluoride and polyvinyl alcohol" and fails to suggest the significant improvement in adhesive layer peel strength achieved using this polymer in accordance with the invention of independent Claim 1 when "a weight ratio of the adhesive resin to the filler is not less than 1/5 and not more than 2".

Furthermore, Delnick at column 7, lines 24-27, discloses "a ratio of polymer binder to solid particulate matter ranging from about 5/95 to 35/65". However, Delnick does not disclose what kind of ratio the ratio is (weight, volume, etc.). Delnick fails to suggest the independent Claim 1 limitation that "a *weight ratio* of the adhesive resin to the filler is not less than 1/5 and not more than 2".

Pursuant to M.P.E.P. §821.04, after independent product Claim 1 is allowed, Applicants respectfully request examination of method Claim 14, which includes all of the limitations of product Claim 1.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

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